REMARKS

Applicants note the Examiner's restriction of the examination to Claims 53-78, 82-102, and 106-122. However, as the nonelected claims are dependent claims they are not currently being canceled as they depend from a generic claim.

The Examiner is formally rejecting Claim 62 under 35 U.S.C.§112, first paragraph, because the specification is enabling for a magnetic moment of 0.2 to 1.0 memu/cm^2 (Patent Application at page 15, lines 1-5) but is allegedly not enabling for a magnetic moment of 100-600 memu/cm^3 (Patent Application at page 14, lines 14-19). The Examiner is correct that the unit "memu" is incorrect for magnetic remanence. The correct unit is "emu". The use of "memu" causes the values of Mr and Mrt to be off by a factor of 1,000. As stated by the Examiner (Office Action page 21), the use of "memu" is an obvious error to one of ordinary skill in the art. When the unit change from "memu" to "emu" is made, the disclosed range for the Mrt, which is from about 0.2 to about 1.0 memu/cm^2, is within the theoretical range of 0.06 to 1.8 memu/cm^2 as computed by the Examiner at page 21 of the Office Action.

The Examiner is rejecting Claims 53-58, 63-64, 66-68, 75-78, 82-86, 91-92, 96, 99, 101-102, 106-108, 113, and 118-119 under 35 U.S.C.§102(b) as being anticipated by Aida et al. (JP 06-215344 A); Claims 53-59, 63-64, 66-67, 75-78, 82-83, 106-108, 111, 113, and 118 under 35 U.S.C.§102(b) as being anticipated by U.S. 4,663,009 to Bloomquist et al.; Claims 87, 94, 109, and 121 under 35 U.S.C.§103(a) as being unpatentable over Aida et al.; Claims 61, 88, and 110 under 35 U.S.C.§103(a) as being unpatentable over Aida et al. and further in view of Wu et al. (U.S. 6,156,422); Claims 59, 89, and 111 under 35 U.S.C.§103(a) as being unpatentable over Aida et al.

and further in view of Bloomquist et al.; Claims 60, 90, and 112 under 35 U.S.C.§103(a) as being unpatentable over Aida et al. and in view of Bloomquist et al. and further in view of JP 05-189738 A (Murata et al.); Claims 65, 97-98, and 114-115 are rejected under 35 U.S.C.§103(a) as being unpatentable over Aida et al. and further in view of U.S. 2002/0114978 to Chang et al.; Claims 69-74, 93, 95, 100, 117, 120, and 122 are rejected under 35 U.S.C.§103(a) as being unpatentable over Aida et al. and further in view of U.S. 5,900,324 to Moroishi et al.; Claims 68, 84-87, 89, 91-92, 94, 96, 99, 101-102, 109, 116, 119, and 121 are rejected under 35 U.S.C.§103(a) as being unpatentable over Bloomquist et al. and further in view of Aida et al.; Claim 61 is rejected under 35 U.S.C.§103(a) as being unpatentable over Bloomquist et al. and further in view of Wu et al.; Claims 88 and 110 are rejected under 35 U.S.C.§103(a) as being unpatentable over Bloomquist et al. in view of Aida et al. and further in view of Wu et al.; Claims 60 and 112 are rejected under 35 U.S.C.§103(a) as being unpatentable over Bloomquist et al. and further in view of Murata et al.; Claim 90 is rejected under 35 U.S.C.§103(a) as being unpatentable over Bloomquist et al. and further in view of Murata et al.; Claims 65, 114, and 115 are rejected under 35 U.S.C.§103(a) as being unpatentable over Bloomquist et al. and further in view of Chang et al.; Claims 97-98 are rejected under 35 U.S.C.§103(a) as being unpatentable over Bloomquist et al. in view of Aida et al. and further in view of Chang et al.; Claims 69-74 are rejected under 35 U.S.C.§103(a) as being unpatentable over Bloomquist et al. and further in view of Moroishi et al.; and Claims 93, 95, 100, 117, 120 and 122 are rejected under 35 U.S.C.§103(a) as being unpatentable over Bloomquist et al. in view of Aida et al. and further in view of Moroishi et al.

Applicant respectfully traverses the Examiner's rejections because the cited references fail to teach, individually or collectively, at least the italicized features of the independent claims as follows:

> 53. A disk for information storage, comprising:
> (a) a substrate; and
> (b) an information layer for containing information, wherein at least one of the following conditions is true: (i) the disk has at least two recording parameters that vary *inversely* radially outwardly and (ii) the information layer has a thickness *that increases progressively from an inner disk diameter to an outer disk diameter.*

> 134. A disk for information storage, comprising:
> (a) a substrate; and
> (b) an information layer operable to contain information, wherein at least one of the following conditions is true: (i) *the information layer has a first magnetic remanence at a first inner radial location that is less than a second magnetic remanence of the information layer at a second outer radial location and (ii) the information layer has a first magnetic moment at the first inner radial location that is less than a second magnetic moment of the information layer at the second outer radial location.*

> 135. A disk for information storage, comprising:
> (a) a substrate; and
> (b) an information layer configured to contain information, wherein a first recording parameter of the information layer at a first radial location is *higher* than the first recording parameter at a second, different radial location and a second recording parameter of the information layer at the first radial location is *lower* than the second recording parameter at the second radial location and *wherein the first and second first recording parameters are different from one another.*

In a preferred configuration, the present invention is directed to increasing the magnetic remanence and/or the magnetic moment (Mrt) of the disk from the inner disk diameter to the outer disk diameter and decreasing the coercivity from the inner disk diameter to the outer disk diameter. These trends reflect the unique operating conditions in each of the two regions. That is, the higher

coercivity and lower magnetic moment in the ID region support a higher linear density due to reduced UBD, and the lower coercivity and higher magnetic moment in the OD region improves writing properties and signal-to-noise radio. The increased Mrt or magnetic remanence in the OD region can provide a higher signal strength (or SNR), thereby permitting more noise to be tolerated and a higher linear bit density (or UBD) to be utilized. The decrease in the coercivity towards the OD region further provides better writing properties in the OD region (in which recording heads typically encounter more resistance to recording or writing bits), thereby providing reduced demands (relative to existing storage media) on the write head, the data detection channel, and the pre-amplifier, and permitting the head to write to the disk at a higher data rate.

Aida et al.

For the convenience of the Examiner, attached to this Amendment and Response is a full translation of Aida et al.

Aida et al. is directed to a magnetic recording medium in which the product of the coercive force and the magnetic film thickness is changed as the head flying height changes radially. The product value appears to be reduced at the outer periphery of the disk (where flying height is highest) and increased at the inner periphery of the disk (where flying height is lowest). According to Aida et al., the product is varied by texturing of a P-Ni plating layer to change the center line coarseness R_a so that H_c (or the coercivity) is greatest at the inner disk radius, varying the thickness of the magnetic film, and changing the crystalline structure of the magnetic film by changing the film thickness of the nonmagnetic Cr undercoat layer.

Aida et al. fails to teach (and in fact teaches away from) the increase in the thickness of the magnetic layer from the inner to the outer radii, the increase in the magnetic remanence from the inner to the outer radii, and the simultaneous variation of both the magnetic layer thickness and under layer thickness as a function of radius. As will be appreciated, the magnitude of the magnetization-thickness product (Mrt), magnetization product, and magnetic moment is directly related to the thickness of the information layer. While the present invention increases the Mrt, magnetization product, and magnetic moment radially outward, Aida et al. teaches that the thickness of the information layer (and therefore the Mrt, magnetization product, and magnetic moment) is decreased radially outward. As noted, Aida et al. teaches that the product of the coercivity and information layer thickness is decreased at the outer disk periphery and increased at the inner disk periphery. Thus, Aida et al. teaches that the Mrt, magnetization product, and magnetic moment on the one hand and coercivity on the other are varied in the same manner and not in an inverse manner as is done in the present invention.

The Examiner counters with the argument that the variation of the thicknesses of the magnetic layer alone and simultaneous variation with the thickness of the under layer is an obvious equivalent to the teachings of Aida et al. and Bloomquist et al. In other words, based on the teaching to vary coercivity by a combination of varying magnetic layer or under layer thickness or of varying chemical composition of the magnetic layer and under layer thickness it would be obvious to vary the thicknesses of both layers. As noted previously, this is not true as increasing the thickness of the magnetic layer towards the outer radius would have the reverse effect; namely, such an increase in thickness would increase not decrease the coercivity.

Bloomquist et al.

Bloomquist et al. fails to overcome the deficiency of of Aida et al. At col. 16, lines 3-42, Bloomquist et al. essentially describes the invention of Aida et al. and states that a coercivity gradient (decreasing from inner to outer peripheries) can be formed "by progressively decreasing the concentration of platinum in the cobalt of the magnetic layer from inner to outer diameters of the disk" and "by varying the thickness of the first sputtered chromium under layer". Bloomquist et al. is silent on varying the thickness of the information layer. Accordingly, Bloomquist et al. too fails to teach the increase in the thickness of the magnetic layer from the inner to the outer radii, the increase in the magnetic remanence from the inner to the outer radiis, and the simultaneous variation of both the magnetic layer thickness and under layer thickness as a function of radius.

The remaining references, namely Wu et al., Murata et al., Chang et al., and Moroishi et al., fail to overcome the deficiencies of Aida et al. and Bloomquist et al.

The dependent claims provide additional reasons for allowance.

By way of example, dependent Claim 61 provides that the magnetic remanence is one of the recording parameters, the magnetic remanence ranges from about 100 to about 600 emu/cm^3, and a first magnetic remanence at a first inner radial location is no more than about 95% of a second magnetic remanence at a second outer radial location. (See also Claims 87, 109, and 121)

Dependent Claim 62 provides that the magnetic moment is one of the recording parameters, the magnetic moment ranges from about 100 to about 600 emu/cm^3, and a first magnetic moment at a first inner radial location is no more than about 95% of a second magnetic moment at a second outer radial location. (See also Claim 94)

Dependent Claim 69 provides that the thickness of the information layer ranges from about 60 to about 300 angstroms and the information layer has a first thickness at a first inner radial location and a second thickness at a second outer radial location and the first thickness is at least about 75% of the second thickness. (See also Claim 92)

Dependent Claim 70 provides that the information layer includes a first magnetic layer, a second magnetic layer, and an at least substantially non-magnetic layer located between the first and second magnetic layers and a thickness of at least one of the first and second magnetic layers increases from the inner diameter to the outer diameter.

Dependent Claim 77 provides that a bit length in an outer diameter region is greater than a bit length in an inner diameter region. (See also Claim 85)

Dependent Claim 82 provides that the information layer has a first areal density at a first inner radial location and a second areal density at a second outer radial location and the first areal density is at least about 105% of the second areal density. (See also Claims 83 and 101)

Applicant has added new dependent Claims 126-133, which provide additional reasons for allowance. Regarding Claims 131-133, the claims require the information layer to exchange information (through read/write operations) with a magnetoresistive head. Aida et al. and Bloomquist et al. are directed to disks for inductive heads, which are operationally quite different from magnetoresistive heads. Due to the differences in operation, it is not obvious to one of ordinary skill in the art to extend the teachings of Aida et al. and Bloomquist et al. to design a disk for a magnetoresistive head. In the case of inductive heads, the speed of travel of the head causes the head

to fly higher over the outer portions of the disk, which can impair writing to and reading from the disk. The same issue does not apply to magnetoresistive heads.

It is submitted that the application is now in form for allowance. Therefore, early notification of same is respectfully requested. The Examiner is invited to contact the undersigned by telephone if doing so would assist in the resolution of this case.

Respectfully submitted,

SHERIDAN ROSS P.C.

By: Douglas Swartz

Douglas W. Swartz
Registration No. 37,739
1560 Broadway, Suite 1200
Denver, Colorado 80202-5141
(303) 863-9700

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